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An experimental assessment of the aquaculture potential of the brown mussel, *Modiolus metcalfei*

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The shallow subtidal species of brown mussel, *Modiolus metcalfei*, attached to each other, carpets the muddy bottoms of many Philippine bays with its dense populations. A widespread species, it occurs in most Visayan islands, Luzon and Mindanao.

The farming of any organism depends upon the availability of seed stock. The possibility of collecting *Modiolus* spats using artificial substrate is of primary importance in determining the feasibility of farming the species.

This study was conducted at Banate Bay, Iloilo from November, 1975 to March 30, 1976. Four types of materials were initially tested as spat collectors: coconut coir rope, blue polypropylene fiber rope, black polypropylene film rope and black fibrillated polypropylene film (Tortell, 1977).

Upon retrieval, the experimental spat collectors were immersed in 10% neutralized formalin and brought to the laboratory in separate plastic vials. The settlement was collected in a beaker and concentrated in 300-u mesh plankton net and examined under a stereoscope.

No *Modiolus* spats settled on any of the experimental collectors during the entire study period. Only *M. smaragdinus*; winged oyster, *Pteria* sp.; oysters; gastropods; bryozoans; colonial tunicates, barnacles, and other fouling organisms were found (Table 1). Instead the *Modiolus* spats were attached to the exposed posterior half of the living *Modiolus* collected for reproductive cycle studies. The number of spats ranged from 0 to 9 per adult mussel (Table 2) with size ranging from 1 to 5.4 mm (measured from umbo to posterior tip) with the heaviest settlement in December.

Table 1. Typical settlement on a 10 cm coir rope. The date of sampling is also the date for installing the succeeding collector.*

Date sampled	Mytilus	Pteria	Other bivalves	Amphipod	Gastropod	Polychaetes	Hydrozoa	Tunicates	Barnacles	Bryozoa
Nov. 15	25	36	2	5	1	1	x	—	x	x
Dec. 1	7	23	14	39	4	4	x	—	—	x
Dec. 15	25	3	20	20	18	3	x	—	—	—
Jan. 6	3	1	9	100	4	2	x	—	x	x
Jan. 19	4	1	7	93	8	1	x	—	—	x
Feb. 2	1	1	10	45	2	1	x	—	—	x
Feb. 16	0	0	1	14	2	1	x	—	x	—
Mar. 1	0	0	1	39	3	1	x	—	—	x
Mar. 15	1	0	1	70	0	3	x	x	—	—
Mar. 30	4	0	10	40	4	2	x	—	x	—
Apr. 12	15	0	4	36	13	2	x	—	—	x
Apr. 26	4	0	24	39	14	2	x	—	—	—
May 10	3	0	8	33	72	6	x	—	—	—

Table 2. Spat settlement of the brown mussel, *Modiolus metcalfei*, on valves of adult mussels, Banate Bay, Iloilo.

Date	No. of mussels* with spats	No. spats per mussel (range)	Total no. spats
Nov. 15/75	1	3	3
Dec. 1	14	1-9	45
Dec. 15	12	1-7	34
Jan. 7/76	7	1-3	10
Jan. 20	0	—	—
Feb. 2	3	1	3
Feb. 16	0	—	3
Mar. 1	4	1	4
Mar. 15	2	1	4
Mar. 30	5	1	5

*Out of sample of 25 mussels.

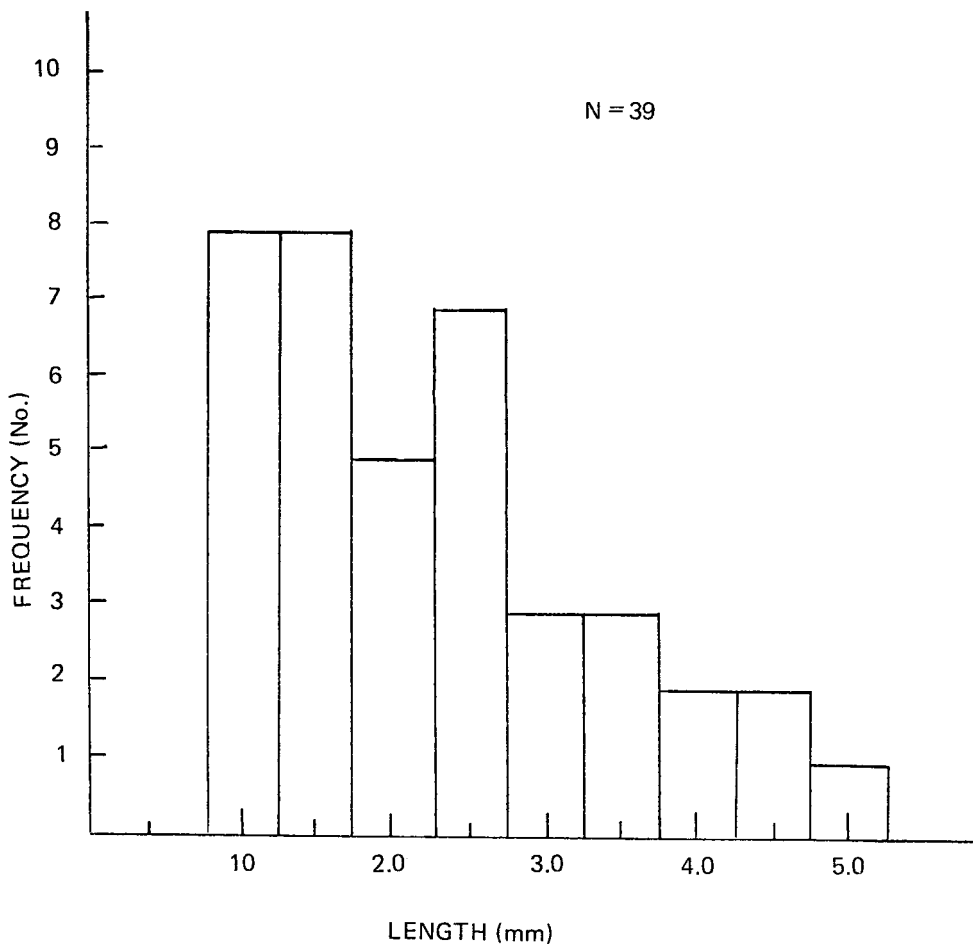


Figure 1. Length-frequency of brown mussel spats found on adult mussels collected from Banate Bay, Iloilo, December 15, 1975.

The brown mussel is observed to occur together with the green mussel in all known green mussel areas. However, very low numbers have been found in clusters of green mussel growing off-bottom. In purely brown mussel areas, the spats do not settle on the surfaces of bamboo fish corrals or other similar structures in the water. This settlement preference evolved as a survival mechanism, since, in a brown mussel bed living mussel valves provide refuge from the muddy bottom which smothers a newly settled mussel.

In view of its settlement characteristics, the aquaculture potential of the brown mussel may be considered very low. Improvement of its production potential, should therefore be approached along the line of resource-management rather than aquaculture. Institution of a closed season to allow for spawning and recruitment may not be effective since the new recruits might be collected together with the harvestable stock. On the other hand, recruitment will be dependent on the number of adults, i.e., settlement surfaces available. Since the brown mussel has a propensity to form dense mats on the muddy bottom, space without doubt becomes the most important factor limiting further population growth. Management of a brown mussel stock should then be aimed at two objectives: maintenance of enough adults as settlement surfaces, and provision of space to allow new recruits to grow. A possible solution therefore, is controlled harvesting or thinning after the peak in the settlement season. In this manner, the chances of a mussel bed recovering year after year may be enhanced.

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